Differential Equations 2010 vol.46 N7, pages 1042-1052

Limit Galerkin-Petrov Schemes for a Nonlinear Convection-Diffusion Equation

Fedotov E.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

In the present paper, we suggest a version of the nonconformal finite-element method (a perturbed Galerkin method) for approximating a quasilinear convection-diffusion equation in divergence form. A grid scheme is constructed with the use of an approach based on the Galerkin-Petrov approximation to the mixed statement of the original problem. The separated coordinate approximation of the solution components for the mixed problem permits one to take into account the direction of convective transport and preserve the main properties of the spatial operator of the original problem. We prove the stability of the line method scheme and a two-layer weighted scheme for the original problem. © 2010 Pleiades Publishing, Ltd.

http://dx.doi.org/10.1134/S0012266110070116